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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,618	10/29/2003	James O'Neil	200312535-1	7287
22879 7590 05/24/2010 HEWLETT-PACKARD COMPANY Intellectual Property Administration 3404 E. Harmony Road Mail Stop 35 FORT COLLINS, CO 80528			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 05/24/2010	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/697,618

**Applicant(s)**

O'NEIL ET AL.

**Examiner**

Rodney G. McDonald

**Art Unit**

1795

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 and 67-86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 and 67-86 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Prosecution Reopened***

Prosecution on the merits of this application is reopened because of the new evidence submitted by Applicant and since the Application cannot be reheard based on *the same record*

***Allowable Subject Matter.***

The indicated allowability of claims 12-14 and 67-86 is withdrawn in view of the new 35 U.S.C. 112 rejection.

***Claim Rejections - 35 USC § 112***

Claims 1-37 and 67-86 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant's claims are directed to a method of forming a thin-film fuel cell electrode, comprising, inter alia, "developing a deposition characteristic profile having at least one porous layer based on pre- determined desired electrode properties." The Specification provides a general discussion of the variables of a process for producing a thin-film electrode and film characteristics such as thickness, composition, gradient, and porosity. However, there is no description of what process variables or film characteristics are desirable or acceptable. That is, the Specification does not provide a description of the desired compositional and/or morphological characteristics of the electrode. The Specification does not provide a description of the components utilized for deposition (e.g., copper, aluminum, or titanium), or the resulting properties of the

deposited film (e.g., film thickness, gradient or porosity). The Specification also does not provide a description as to how the desired compositional and/or morphological characteristics are determined. That is, Applicant's have not defined in the Specification how to determine the compositional and/or morphological characteristics related to a predicated outcome. Moreover, there is no discussion as to how to adjust the apparatus to achieve desired or acceptable results. The claimed invention is not limited to the application of a specific type of thin-film electrode. The claimed invention is sufficiently broad to encompass the application of any type of material layer suitable for deposition to form an electrode. Applicant's have not directed us to portions of the Specification that adequately apprise one skilled in the art of the conditions required for selecting the desired electrode properties. That is, Applicant's have not identified other characteristics that must be met in order to determine the desired electrode properties. Moreover, Applicant's have not identified limits on the process variables that would be required to produce desired electrode properties.

A person of ordinary skill in the art designing a thin-film electrode would not appreciate when the claimed invention has been infringed. *See Advantage Dental Prodx*, 309 F.3d at 779-80. This is because the Specification provides no description of specific desired electrode properties or how to produce such electrodes.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, 34, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. (U.S. Pat. 5,395,704) in view of Montcalm et al. (U.S. Pat. 6,668,207).

Regarding claim 1, Barnett et al. teach a method of forming a thin film fuel cell electrode. (See Abstract) Barnett et al. teach providing a substrate and at least one deposition device. (Column 3 lines 56-68; Column 4 lines 1-38) A film is deposited that has a porous property since the films deposited have densities of from 75% to >85%. (Column 4 lines 62-65) The position of the substrate can be varied by rotating the substrate with respect to the targets. (Column 4 lines 29-33)

Regarding claim 15, Barnett et al. teach providing at least first and second deposition devices. (Column 3 lines 56-68; Column 4 lines 1-38)

Regarding claim 31, Barnett et al. teach utilizing second and third deposition devices. (Column 3 lines 56-68; Column 4 lines 1-38)

Regarding claim 34, the electrode comprises an anode. (Column 5 lines 37-57)

Regarding claim 35, the anode can be Ni-YSZ. (Column 5 lines 50-53)

Regarding claim 36, the electrode comprises a cathode. (Column 5 lines 37-57)

The differences between Barnett et al. and the present claims is that the deposition characteristic profile for the film is not discussed (Claim 1), varying the relative position of the substrate with respect to at least one axis in order to achieve the deposition characteristic profile is not discussed (Claim 1), the varying of the power is not discussed (Claims 2, 16), advancing the substrate along a substrate advancement path is not discussed (Claims 5, 20), varying the speed of the substrate is not discussed (Claims 6, 21, 32) and traversing the substrate back and forth is not discussed (Claims 9, 24).

Regarding the deposition characteristic profile for the film and varying the relative position of the substrate with respect to at least one axis in order to achieve the deposition characteristic profile (Claim 1), Montcalm teach a method for achieving a selected thickness profile and varying the relative position of the substrate to at least one axis in order to achieve a deposition characteristic profile by controlling the velocity and spinning the substrate as the substrate sweeps across the source. (See Abstract; Column 7 lines 8-15; Column 7 lines 46-51)

Regarding claim 2, 16, Montcalm teach controlling the power to control the desired thickness profile. (Column 7 lines 8-15)

Regarding claims 5, 20, Montcalm teach advancing the substrate along a substrate advancement path. (Column 7 lines 37-45)

Regarding claims 6, 21, 32, Montcalm teach that the speed of the substrate can be varied to control the thickness profile. (Column 7 lines 8-15)

Regarding claims 9, 24, Montcalm teach that the substrate can be traversed back and forth. (Column 7 lines 37-39)

The motivation for utilizing the features of Montcalm is that it allows for producing highly uniform films. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Barnett et al. by utilizing the features of Montcalm et al. because it allows for producing uniform films.

Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. in view of Montcalm et al. as applied to claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, 34, 35 and 36 above, and further in view of Tsai et al. "Bias sputtered deposition of dense Ytria-Stabilized Zirconia Films on Porous Substrates", J. Electrochem. Soc., Vol. 142, No. 9, September 1995 pp. 3084-3087.

The difference not yet discussed is the varying of the bias to the substrate. (Claims 3, 17)

Regarding claims 3 and 17, Tsai et al. teach controlling the bias of the substrate during deposition in order to control the structure of the film. (See Abstract; Page 3085)

The motivation for utilizing the features of Tsai et al. is that it allows for controlling the structure of the film. (Page 3085)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Tsai et al. because it allows for controlling the structure of the film.

Claims 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. in view of Montcalm et al. as applied to claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, 34, 35 and 36 above, and further in view of Ueda (Japan 63-195263).

The difference not yet discussed is the varying of the magnetic field. (Claims 4, 19)

Regarding claims 4, 19, Ueda teach utilizing a varying magnetic flux density during deposition to obtain a homogenous thin film. (See Abstract)

The motivation for utilizing the features of Ueda is that it allows for achieving a homogenous thin film. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Ueda because it allows for achieving a homogenous thin film.

Claims 7, 8, 10, 11, 18, 22, 25, 26, 30 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. in view of Montcalm et al. as applied to claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, 34, 35 and 36 above, and further in view of Kobayashi (Japan 05-021347).



The difference not yet discussed is the varying of the distance (Claims 7, 18, 22, 30), the varying of the speed (Claim 8), varying the distance in multiple directions is not discussed (Claims 10, 25), varying the speed is not discussed (Claims 11, 26) and varying the substrate advancement path is not discussed (Claim 33).

Regarding claims 7, 18, 22, 30, Kobayashi et al. teach varying the distance between the deposition source and the substrate so that the composition of the film can be the same as when the film was first deposited. (See Abstract)

Regarding claim 8, Montcalm already discussed above teach varying the speed of the substrate for depositing a uniform film. (See Montcalm discussed above)

Regarding claims 10, 25, since Montcalm teach rotating the substrate and Kobayashi teach changing the distance between substrate and deposition source the distance is varied in multiple directions between the substrate and the deposition. (i.e. in the horizontal and vertical directions.) (See Montcalm and Kobayashi discussed above)

Regarding claims 11, 26, Montcalm is discussed above and teach varying the speed of the substrate. (See Montcalm discussed above)

Regarding claim 33, since Montcalm teach rotating the substrate and Kobayashi teach changing the distance between substrate and deposition source the substrate advancement path is varied. (See Montcalm and Kobayashi discussed above)

The motivation for utilizing the features of Kobayashi is that it allows for controlling the composition of the film. (See Kobayashi et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Kobayashi et al. because it allows for controlling the composition of the film.

Claims 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. in view of Montcalm et al. and further in view of Kobayashi et al. as applied to claims 1, 2, 5, 6, 7, 8, 9, 10, 11, 15, 16, 18, 20, 21, 22, 24, 26, 30, 31, 32, 33, 34, 35 and 36 above, and further in view of Wang et al. (U.S. Pat. 6,364,956).

The difference not yet discussed is the use of a shutter (Claim 23).

Regarding claim 23, Wang teach utilizing a shutter to selectively block at least a portion of the a material expelled from at least on of the deposition devices. (See Abstract)

The motivation for utilizing the features of Wang is that it allows for production of a gradient film. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a shutter as taught by Wang because it allows for producing gradient films.

Claim 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnett et al. in view of Montcalm et al. as applied to claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, 34, 35 and 36 above, and further in view of Surampudi et al. (U.S. Pat. 5,773,162).

The difference not yet discussed is the material of the cathode. (Claim 37)

Regarding claim 37, Surampudi et al. teach that the material for the cathode material of a fuel cell can be sputtered platinum, (Column 12 lines 63-68)

The motivation for utilizing the features of Surampudi et al. is that it allows production of a fuel cell. (Column 12 lines 63-68)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Surampudi et al. because it allows for production of fuel cell.

### ***Response to Arguments***

Applicant's arguments filed September 7, 2007 (Arguments present in the Appeal Brief) and November 24, 2009 (Arguments submitted with respect to the 35 U.S.C. 112 2nd paragraph rejection) have been fully considered but they are not persuasive.

#### ***The 35 U.S.C. 103 rejections:***

***i.) Response to the arguments of claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, and 34-36 as obvious over Barnett in view of Montcalm et al.:***

In response to the argument that Barnett fail to teach controlling the deposition characteristic profile to control desired electrode properties, it is argued that Barnett teach depositing electrodes for a fuel cell while moving the substrate by rotating the substrates. The secondary reference to Montcalm et al. teach a deposition characteristic profile in the form of a deposited thickness profile which is based on the film property of achieving a uniform thickness. Montcalm et al. achieves this by rotating and controlling the velocity of their substrates. Therefore one of ordinary skill in the art would know from the teachings of Montcalm et al. that the rotating substrates of Barnett would achieve a deposition characteristic profile. This film would have a desired

electrode property because Barnett's film is an electrode film. (See Barnett and Montcalm et al. discussed above)

In response to the argument that Montcalm et al. do not teach developing a deposition characteristic profile based on electrode properties, it is argued that while Montcalm et al. teach depositing optical films Montcalm et al. teach controlling rotation of the substrates to deposit films with a deposition characteristic profile. Since the primary reference to Barnett teach rotating substrates and depositing electrode films it would follow from the teachings of Montcalm that Barnett's electrode film will have a deposition characteristic profile. (See Barnett and Montcalm discussed above)

Applicant has additionally argued that the prior art does not teach controlling the film composition, porosity/density and modulation of porosity deposition characteristics. These features are not found in the claims on appeal. In fact such limitations are present in already allowed claims not involved in this appeal.

***ii.) Response to the arguments of claims 3 and 17 as being obvious over Barnett in view of Montcalm and further in view of Tsai et al.:***

In response to the argument that Tsai et al. do not teach varying the bias in accordance with a deposition characteristic profile, it is argued that Tsai et al. teach that varying the bias can control the structure of the film and taken in concert with the references of Barnett and Montcalm would lead to a deposition characteristic profile. (See Barnett, Montcalm and Tsai et al. discussed above)

***iii.) Response to the arguments of claims 4 and 19 as being obvious over Barnett in view of Montcalm and further in view Ueda:***

In response to the argument that Ueda teach away from the claimed invention because Ueda teach forming a homogenous film which is not desired a deposition characteristic profile for desired electrode properties, it is argued that Ueda do not teach away because a deposition characteristic profile can be one where the film is homogenous throughout. The claims are not limitative to an inhomogeneous film. (See Ueda discussed above)

***iv) Response to the arguments of claims 7, 8, 10, 11, 18, 22, 25, 26, 30 and 33 as obvious over Barnett, Montcalm and Kobayashi:***

In response to the argument that this rejection is traversed for the same reasons as claim 1 is traversed, it is argued that claim 1 is obvious over the cited references discussed above. As such these claims will stand or fall with claim 1.

***v) Response to the argument of claim 23 as obvious over Barnett, Montcalm, Kobayashi and Wang:***

In response to the argument that this rejection is traversed for the same reasons as claim 1 is traversed, it is argued that claim 1 is obvious over the cited references discussed above. As such these claims will stand or fall with claim 1.

***vi) Response to the argument of claim 37 as obvious over Barnett, Montcalm and Surampudi:***

In response to the argument that this rejection is traversed for the same reasons as claim 1 is traversed, it is argued that claim 1 is obvious over the cited references discussed above. As such these claims will stand or fall with claim 1.

***The 35 U.S.C. 112 2nd paragraph rejections:***

In response to the Applicant's argument that the metes and bounds of the claims are definite (it should be noted that the Examiner has included in this rejection claims 12-14, 67-86 since it contains the same limitations as the other claims that are rejected), it is argued that the claims do not set forth the required metes and bounds of the pre-determined desired electrode properties. While Applicant points out that the operating environment will determine the desired characteristic for the electrode the claims as written do not require determining the operating environment in order to determine the desired characteristic of the electrode. As such the metes and bounds of the term "pre-determined" is not set forth in the claim.

***The 1.132 Declaration:***

It is argued that while Applicant points out that the operating environment will determine the desired characteristic for the electrode the claims as written do not require determining the operating environment in order to determine the desired characteristic of the electrode. As such the metes and bounds of the term "pre-determined" is not clearly set forth in the claim.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/  
Primary Examiner, Art Unit 1795

Rodney G. McDonald  
Primary Examiner  
Art Unit 1795

RM  
May 19, 2009